

Claims

1. A grating image having one or more grating fields, each of which includes an electromagnetic-radiation-influencing grating pattern comprising
5 a plurality of grating lines, the grating lines being characterized by the parameters orientation, curvature, spacing and profile, **characterized in that**, in the grating image, a grating field that is separately perceptible with the naked eye includes an electromagnetic radiation-influencing grating pattern having grating lines for which at least one of the characteristic parameters
10 orientation, curvature, spacing and profile varies across the surface of the grating field.
2. The grating image according to claim 1, **characterized in that** said grating field includes an electromagnetic radiation-influencing grating
15 pattern comprising uninterrupted grating lines.
3. The grating image according to claim 1 or 2, **characterized in that** the varying characteristic parameter(s) exhibit a continuous variation across the surface of the grating field.
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4. The grating image according to claim 1 or 2, **characterized in that** the varying characteristic parameter(s) exhibit a random, especially a random and discontinuous variation across the surface of the grating field.
- 25 5. The grating image according to at least one of claims 1 to 4, **characterized in that** said grating field includes at least one further electromagnetic radiation-influencing grating pattern having grating lines for which at least one of the characteristic parameters orientation, curvature, spacing and profile varies across the surface of the grating field.

6. The grating image according to claim 5, **characterized in that** the electromagnetic radiation-influencing grating patterns exhibit a variation in those same parameters.

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7. The grating image according to claim 5 or 6, **characterized in that** the grating lines of the electromagnetic radiation-influencing grating pattern differ from one another by a non-varying characteristic parameter, especially by the orientation of the grating lines.

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8. The grating image according to at least one of claims 1 to 7, **characterized in that** said grating field forms a matte pattern that displays no diffractive effects when viewed.

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9. The grating image according to at least one of claims 1 to 8, **characterized in that** the grating fields exhibit different optical brightness.

10. A grating image having multiple grating fields, each of which includes an electromagnetic radiation-influencing grating pattern comprising a plurality of grating lines, the grating lines being characterized by the parameters orientation, curvature, spacing and profile, and a first grating field including grating lines having first characteristic parameters, and a second, adjacent grating field including grating lines having second characteristic parameters, **characterized in that** between the first and second grating field is provided a transition area in which the characteristic parameters of the grating lines of the first grating field continuously change into the characteristic parameters of the grating lines of the second grating field.

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11. The grating image according to claim 10, **characterized in that**, in the transition area, the grating lines of the first grating field change without interruption into grating lines of the second grating field.
- 5 12. The grating image according to claim 10 or 11, **characterized in that** the transition area exhibits a size below the resolution limit of the naked eye.
13. The grating image according to claim 10 or 11, **characterized in that**, to achieve additional optical effects in the transition area, the transition area
10 exhibits a size above the resolution limit of the naked eye.
14. The grating image according to at least one of claims 10 to 13, **characterized in that** the first and/or second grating field constitutes a grating field according to one of claims 1 to 9 that is separately perceptible
15 with the naked eye.
15. The grating image according to claim 14, **characterized in that** one of the two grating fields forms a matte pattern that displays no diffractive effects when viewed.
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16. The grating image according to at least one of claims 10 to 15, **characterized in that** at least one of the grating fields exhibits different optical brightness.
- 25 17. The grating image according to at least one of claims 1 to 16, **characterized in that** the grating lines are electron beam lithographically produced.

18. The grating image according to at least one of claims 1 to 17,
characterized in that the grating lines exhibit a line profile depth between
about 100 nm and about 400 nm.
- 5 19. The grating image according to at least one of claims 1 to 18,
characterized in that the grating image is coated with a reflecting or high-
index material.
20. The grating image according to at least one of claims 1 to 19,
10 characterized in that the grating image includes a machine-readable
identifier that is not visible with the naked eye.
21. The grating image according to at least one of claims 1 to 20,
characterized in that the grating image is combined with a color-shifting
15 thin-film structure.
22. A method for manufacturing a grating image, in which are produced
in a substrate one or more grating fields, each of which is filled with an
electromagnetic radiation-influencing grating pattern comprising a plurality
20 of grating lines, the grating lines being characterized by the parameters
orientation, curvature, spacing and profile, characterized in that, in the
grating image, a grating field that is separately perceptible with the naked
eye is filled with an electromagnetic radiation-influencing grating pattern
having grating lines for which at least one of the characteristic parameters
25 orientation, curvature, spacing and profile is varied across the surface of the
grating field.
23. A method for manufacturing a grating image, in which are produced
in a substrate multiple grating fields, each of which is filled with an

electromagnetic radiation-influencing grating pattern comprising a plurality of grating lines, the grating lines being characterized by the parameters orientation, curvature, spacing and profile, and a first grating field being filled with grating lines having first characteristic parameters and a second, adjoining grating field being filled with grating lines having second characteristic parameters, characterized in that between the first and second grating field is produced a transition area in which the characteristic parameters of the grating lines of the first grating field continuously change into the characteristic parameters of the grating lines of the second grating field.

24. A security element having a grating image according to at least one of claims 1 to 21.

25. The security element according to claim 24, characterized in that the security element is a security thread, a label or a transfer element.

26. A security paper having a security element according to claim 24 or 25.

27. A data carrier having a grating image according to at least one of claims 1 to 21, a security element according to claim 24 or 25, or a security paper according to claim 26.

28. The data carrier according to claim 27, characterized in that the data carrier is a banknote, a value document, a passport, an identification card or a certificate.